General

Guideline Title

American Academy of Orthopaedic Surgeons clinical practice guideline on prevention of orthopaedic implant infection in patients undergoing dental procedures.

Bibliographic Source(s)

American Academy of Orthopaedic Surgeons, American Dental Association. American Academy of Orthopaedic Surgeons clinical practice guideline on prevention of orthopaedic implant infection in patients undergoing dental procedures. Rosemont (IL): American Academy of Orthopaedic Surgeons, American Dental Association; 2012. 320 p. [39 references]

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

Definitions of the strength of recommendations (Strong, Moderate, Limited, Inconclusive, and Consensus) are provided at the end of the "Major Recommendations" field.

Note from the American Academy of Orthopaedic Surgeons (AAOS) and the American Dental Association (ADA): The following is a summary of the recommendations of the AAOS-ADA clinical practice guideline Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures. This summary does not contain rationales that explain how and why these recommendations were developed, nor does it contain the evidence supporting these recommendations. All readers of this summary are strongly urged to consult the full guideline and evidence report for this information. The AAOS and ADA staff is confident that those who read the full guideline and evidence report will see that the recommendations were developed using systematic evidence-based processes designed to combat bias, enhance transparency, and promote reproducibility.

This summary of recommendations is not intended to stand alone. Treatment decisions should be made in light of all circumstances presented by the patient. Treatments and procedures applicable to the individual patient rely on mutual communication between patient, physician, dentist and other healthcare practitioners.

1. The practitioner might consider discontinuing the practice of routinely prescribing prophylactic antibiotics for patients with hip and knee prosthetic joint implants undergoing dental procedures.
   Grade of Recommendation: Limited
2. The AAOS and ADA staff are unable to recommend for or against the use of topical oral antimicrobials in patients with prosthetic joint implants or other orthopaedic implants undergoing dental procedures.
   Grade of Recommendation: Inconclusive

3. In the absence of reliable evidence linking poor oral health to prosthetic joint infection, it is the opinion of the work group that patients with prosthetic joint implants or other orthopaedic implants maintain appropriate oral hygiene.
   Grade of Recommendation: Consensus

Definitions:

Strength of Recommendation Descriptions

Statement Rating	Description of Evidence Strength	Implication for Practice
Strong	Evidence is based on two or more "High" strength studies with consistent findings for recommending for or against the intervention. A Strong recommendation means that the benefits of the recommended approach clearly exceed the potential harm (or that the potential harm clearly exceeds the benefits in the case of a strong negative recommendation), and that the strength of the supporting evidence is high.	Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Moderate	Evidence from two or more "Moderate" strength studies with consistent findings, or evidence from a single "High" quality study for recommending for or against the intervention. A Moderate recommendation means that the benefits exceed the potential harm (or that the potential harm clearly exceeds the benefits in the case of a negative recommendation), but the strength of the supporting evidence is not as strong.	Practitioners should generally follow a Moderate recommendation but remain alert to new information and be sensitive to patient preferences.
Limited	Evidence from two or more "Low" strength studies with consistent findings, or evidence from a single Moderate quality study recommending for or against the intervention or diagnostic. A Limited recommendation means the quality of the supporting evidence that exists is unconvincing, or that well-conducted studies show little clear advantage to one approach versus another.	Practitioners should be cautious in deciding whether to follow a recommendation classified as Limited, and should exercise judgment and be alert to emerging publications that report evidence. Patient preference should have a substantial influencing role.
Inconclusive	Evidence from a single low quality study or conflicting findings that do not allow a recommendation for or against the intervention. An Inconclusive recommendation means that there is a lack of compelling evidence resulting in an unclear balance between benefits and potential harm.	Practitioners should feel little constraint in deciding whether to follow a recommendation labeled as Inconclusive and should exercise judgment and be alert to future publications that clarify existing evidence for determining balance of benefits versus potential harm. Patient preference should have a substantial influencing role.
Consensus[1]	The supporting evidence is lacking and requires the work group to make a recommendation based on expert opinion by considering the known potential harm and benefits associated with the treatment. A Consensus recommendation means that expert opinion supports the guideline recommendation even though there is no available empirical evidence that meets the inclusion criteria.	Practitioners should be flexible in deciding whether to follow a recommendation classified as Consensus, although they may set boundaries on alternatives. Patient preference should have a substantial influencing role.

[1]The AAOS will issue a consensus-based recommendation only when the service in question has virtually no associated harm and is of low cost (e.g., a history and physical) or when not establishing a recommendation could have catastrophic consequences.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Orthopaedic implant infection from dental procedures

Guideline Category

Prevention

Clinical Specialty

Dentistry

Family Practice

Infectious Diseases

Internal Medicine

Orthopedic Surgery

Intended Users

Dentists

Physicians

Guideline Objective(s)

- To help improve prevention and treatment of orthopaedic implant infections in patients undergoing dental procedures based on the current best evidence
- To serve as an educational tool to guide qualified physicians and dentists through a series of treatment decisions in an effort to improve the quality and effectiveness of care

Target Population

Patients who have orthopaedic implants who are undergoing dental procedures

Interventions and Practices Considered

1. Avoiding routine use of prophylactic antibiotics for dental procedures in patients with hip and knee prosthetic joint implants
2. Encouraging appropriate oral hygiene for patients with prosthetic joint implants or other orthopaedic implants

Note: No recommendation could be made for or against the use of topical oral antimicrobials.

Major Outcomes Considered

- Incidence and prevalence rates of dental-related bacteremia
- Orthopaedic implant infection

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Study Selection Criteria

The American Academy of Orthopaedic Surgeons (AAOS) developed a priori article inclusion criteria for their systematic reviews for each preliminary recommendation. These criteria are the group's "rules of evidence" and articles that did not meet them are, for the purposes of this guideline, not evidence.

To be included in the systematic reviews (and hence, in this guideline) an article had to be a report of a study that:

- Study must be of patient population of interest (as described by preliminary recommendations)
- Study must report on >50% of the patient population of interest if results are combined
- Article must be a full article report of a clinical study
- Study must appear in a peer-reviewed publication
- Study must be published in English
- Study must be of humans
- Study must not be an in vitro study
- Study must not be a biomechanical study
- Study must not have been performed on cadavers
- Study must be published in or after 1960
- Study results must be quantitatively presented
- Retrospective case series, medical records review, meeting abstracts, historical articles, editorials, letters, and commentaries are excluded
- Registry data is included
- Case series studies that give patients the treatment of interest AND another treatment are excluded
- Case series studies that have non-consecutive enrollment of patients are excluded
- Study should have 10 or more patients per group
- Composite measures or outcomes, even if they are patient-oriented, are excluded

Systematic reviews or meta-analyses conducted by others, or guidelines developed by other organizations were not included. These documents are developed using different inclusion criteria than those specified by the AAOS-American Dental Association (ADA) work group. Therefore, they may include studies that do not meet the group's inclusion criteria. These documents were recalled if their abstract suggested that they might provide an answer to one of the recommendations, and their bibliographies were searched for additional studies to supplement the systematic review.

Literature Searches

Articles published from January 1966 to July 25, 2011 were included in the literature review search. Three electronic databases were searched: PubMed, EMBASE, and the Cochrane Central Register of Controlled Trials. Strategies for searching electronic databases were constructed by the AAOS Medical Librarian using previously published search strategies to identify relevant studies.

The AAO-ADA staff supplemented searches of electronic databases with manual screening of the bibliographies of all retrieved publications. The

staff also searched the bibliographies of recent systematic reviews and other review articles for potentially relevant citations. All articles identified were subject to the study selection criteria. In addition, the guideline work group examined lists of included and excluded studies for errors and omissions.

AAOS and ADA research staff went to great lengths to obtain a complete set of relevant articles. Having a complete set ensures that the guideline is not based on a biased subset of articles. The study attrition diagram in Appendix III in the original guideline document provides details about the inclusion and exclusion of the studies considered for this guideline. The search strategies used to identify these studies are provided in Appendix IV of the original guideline document.

Number of Source Documents

127 articles were considered for recommendations.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

The American Academy of Orthopaedic Surgeons (AAOS) and American Dental Association (ADA) staff separately evaluated the quality of evidence for each outcome reported by each study. This follows the suggestion of the Grading of Recommendations Assessment, Development and Evaluation (GRADE) working group and others. The staff evaluated quality using a domain-based approach. Such an approach is used by the Cochrane Collaboration. Unlike the Cochrane Collaboration's scheme, the scheme AAOS follows allows for evaluation of studies of all designs. The domains used are whether:

- The study was prospective (with prospective studies, it is possible to have an a priori hypothesis to test; this is not possible with retrospective studies.)
- The study was of low statistical power
- The assignment of patients to groups was unbiased
- There was blinding to mitigate against a placebo effect
- The patient groups were comparable at the beginning of the study
- The intervention was delivered in such a way that any observed effects could reasonably be attributed to that intervention
- Whether the instruments used to measure outcomes were valid
- Whether there was evidence of investigator bias

Each quality domain is addressed by one or more questions that are answered "Yes," "No," or "Unclear." These questions and the domains that each address are shown in Appendix V of the original guideline document.

To arrive at the quality of the evidence for a given outcome, all domains except the "Statistical Power" domain are termed as "flawed" if one or more questions addressing any given domain are answered "No" for a given outcome, or if there are two or more "Unclear" answers to the questions addressing that domain. The "Statistical Power" domain is considered flawed if a given study did not enroll enough patients to detect a standardized difference between means of 0.2.

Domain flaws lead to corresponding reductions in the quality of the evidence. The manner in which the AAOS and ADA staff conducted these reductions is shown in Table 3 in the original guideline document. For example, the evidence reported in a randomized controlled trial (RCT) for any given outcome is rated as "High" quality if zero or one domain is flawed. If two or three domains are flawed for the evidence addressing this outcome, the quality of evidence is reduced to "Moderate," and if four or five domains are flawed, the quality of evidence is reduced to "Low." The quality of evidence is reduced to "Very Low" if six or more domains are flawed.

Some flaws are so serious that the evidence is automatically termed as being of "Very Low" quality, regardless of a study's domain scores. These serious design flaws are:

- Non-consecutive enrollment of patients in a case series
- Case series that gave patients the treatment of interest AND another treatment
- Measuring the outcome of interest one way in some patients and measuring it in another way in other patients

- Low statistical power

Although levels of evidence are mentioned in this guideline, this guideline report did so only to provide some very general information about study quality to those readers familiar with the levels of evidence system of *The Journal of Bone and Joint Surgery - American*. However, for the reasons noted above, AAOS does not use levels of evidence as when they speak of "quality" in this document, and levels of evidence play no role in determination of the grade of the final recommendations.

Applicability

AAOS and ADA staff rated applicability (also called "generalizability" or "external validity") of the evidence for each outcome reported by each study. As with quality, applicability ratings were determined by a computer program that used predetermined questions about specific applicability domains. AAOS and ADA staff rated applicability as "High", "Moderate", or "Low" depending on how many domains were flawed. As with quality, a domain is "flawed" if one or more questions addressing that domain is answered "No" or if two or more are answered "Unclear." AAOS and ADA staff characterized a domain as "flawed" if one or more questions addressing any given domain are answered "No" for a given outcome, or if there are two or more "Unclear" answers to the questions addressing that domain (see Appendix V in the original guideline document for the specific applicability questions employed and the domains that each question addresses).

AAOS and ADA staff questions and domains about applicability are those of the Pragmatic-Explanatory Continuum Indicator Summary (PRECIS) instrument. The questions in this instrument fall into four domains. These domains and their corresponding questions are shown in Appendix V of the original guideline document. The applicability of a study is rated as "High" if it has no flawed domains, as "Low" if all domains are flawed, and as "Moderate" in all other cases.

Methods Used to Analyze the Evidence

Meta-Analysis

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Best Evidence Synthesis

The American Academy of Orthopaedic Surgeons (AAOS) and American Dental Association (ADA) staff included only the best available evidence for any given outcome addressing a recommendation. Accordingly, the AAOS and ADA staff first included the highest quality evidence for any given outcome if it was available. In the absence of two or more studies that reported an outcome at this quality, the AAOS and ADA staff considered studies of the next lowest quality until at least two or more occurrences of an outcome had been acquired. For example, if there were two "Moderate" quality studies that reported an outcome, the AAOS and ADA staff did not include "Low" quality studies that also reported this outcome, but if there was only one "Moderate" quality study that reported an outcome, the AAOS and ADA staff also included "Low" quality studies.

Statistical Methods

When possible, the AAOS and ADA staff recalculates the results reported in individual studies and compiles them to answer the recommendations. The statistical analysis is conducted using STATA 10.0. STATA was used to determine the magnitude, direction, and/or 95% confidence intervals of the treatment effect. For data reported as means (and associated measures of dispersion) the mean difference between groups and the 95% confidence interval was calculated and a two-tailed t-test of independent groups was used to determine statistical significance. When published studies report measures of dispersion other than the standard deviation the value was estimated to facilitate calculation of the treatment effect. In studies that report standard errors or confidence intervals the standard deviation was back-calculated. In studies that only report the median, range, and/or size of the trial, the AAOS and ADA staff estimated the means and variances according to a published method. In some circumstances statistical testing was conducted by the authors and measures of dispersion were not reported. In the absence of measures of dispersion, the results of the statistical analyses conducted by the authors (i.e., the p-value) are considered as evidence. For proportions, the AAOS and ADA staff reports the ratio of events along with the percentage. P-values <0.05 were considered statistically significant.

The AAOS and ADA staff performed network meta-analyses (also known as a mixed treatment comparisons analyses) to ascertain the comparative effectiveness of strategies for preventing bacteremia among patients undergoing dental extraction. All of the trials included in the guideline literature analyses were randomized controlled trials (most, but not all, were of "Moderate" quality; additional details on their quality are

presented in the sections of this guideline that present the results of the appraisal of these studies).

Analyses were performed as described by Lu and Ades using Winbugs v 1.4.3. This method preserves the randomization of the original trials. The Markov chains in the model were said to have converged if plots of the Gelman-Rubin statistics indicated that widths of pooled runs and individual runs stabilized around the same value and their ratio was approximately one. In general, the AAOS and ADA staff performed 100,000 iterations, the first 50,000 of which were discarded as "burn in" iterations for each of the network models that are described. The AAOS and ADA staff specified vague priors for the trial baselines and the basic parameters (normal distribution with mean 0 and variance 10,000) and for the random effects standard deviation (uniform distribution: U[0,2]). The AAOS and ADA staff uses $p < 0.05$ to define statistical significance.

To assess the adequacy of the models, the AAOS and ADA staff checked their overall fit by comparing the posterior mean deviance to the number of data points in any given model. These two figures are approximately equal for models that fit the data well. The AAOS and ADA staff also checked the statistical consistency of the models using a "back-calculation" method for networks with direct evidence from multi-arm trials. This method requires point estimates and dispersions of the trial data being entered into the network meta-analysis. When there were two or more trials comparing two of the same treatments, the AAOS and ADA staff obtained these latter two quantities from traditional random effects meta-analytic models computed according to the method of DerSimonian and Laird. All traditional meta-analyses were performed using STATA.

The AAOS and ADA staff performed separate network meta-analyses for antibiotic prophylaxis and for non-antibiotic prophylaxis (e.g., antiseptic rinses) because the analysis combining both types of prophylaxis resulted in a statistically inconsistent model.

Methods Used to Formulate the Recommendations

Expert Consensus (Nominal Group Technique)

Description of Methods Used to Formulate the Recommendations

To develop this guideline, the American Academy of Orthopaedic Surgeons (AAOS) and American Dental Association (ADA) work group held an introductory meeting on November 20 and 21, 2010 to establish the scope of the guideline and the systematic reviews. Upon completing the systematic reviews, the work group participated in a two-day recommendation meeting on October 15 and 16, 2011 at which time the final recommendations and rationales were edited, written, and voted on.

Formulating Preliminary Recommendations

The work group determined the scope of the guideline by constructing a set of preliminary recommendations. These recommendations specify (what) should be done in (whom), (when), (where), and (how often or how long). The preliminary recommendations function as questions for the systematic reviews that underpin each preliminary recommendation, not as final recommendations or conclusions. To avoid "wordsmithing" discussions at the initial work group meeting, the preliminary recommendations are always worded as recommending for something. Appendix II in the original guideline describes the formulation of preliminary recommendations in further detail.

Once established, these preliminary recommendations cannot be modified until the final work group meeting. At this time, they can only be modified in accordance with the available evidence and only in accordance with the AAOS rules for how the wording of a recommendation depends on the grade of recommendation. No modifications of the preliminary recommendations can require new literature searches and, at the final work group meeting, no recommendations can be added that require the use of expert opinion.

Full Disclosure Information

All of the work group's preliminary recommendations are represented in this guideline. This ensures full disclosure of the information that the AAOS-ADA work group examined, and assures readers that they are seeing *all* the information, and not just a selected portion of it.

Voting on the Recommendations

The recommendations and their strength were voted on using a structured voting technique known as the nominal group technique. The AAOS and ADA staff presents details of this technique in Appendix VII in the original guideline document. Voting on guideline recommendations is conducted using a secret ballot and work group members are blinded to the responses of other members. If disagreement between work group members is significant, there is further discussion to see whether the disagreement(s) can be resolved. Up to three rounds of voting are held to attempt to resolve disagreements. If disagreements are not resolved following three voting rounds, no recommendation is adopted. Lack of agreement is a reason that the grade of some recommendations can be labeled "Inconclusive."

Formal votes on all recommendations that are evidence-based or that read "we are unable to recommend for or against" are only on the recommendations. The rationales require only approval of the work group chair and the methodologists unless the recommendation is consensus-based. Both the recommendation and the rationale of a consensus-based recommendation are the subject of formal votes.

Rating Scheme for the Strength of the Recommendations

Grades of Recommendation

A grade of recommendation expresses the degree of confidence one can have in each of the final recommendations. Grades express how likely it is that a recommendation will be overturned by future evidence, and are termed "Strong," "Moderate," or "Limited." Recommendations addressed by only very low quality studies are consensus-based.

Strength of Recommendation Descriptions

Statement Rating	Description of Evidence Strength	Implication for Practice
Strong	Evidence is based on two or more "High" strength studies with consistent findings for recommending for or against the intervention. A Strong recommendation means that the benefits of the recommended approach clearly exceed the potential harm (or that the potential harm clearly exceeds the benefits in the case of a strong negative recommendation), and that the strength of the supporting evidence is high.	Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Moderate	Evidence from two or more "Moderate" strength studies with consistent findings, or evidence from a single "High" quality study for recommending for or against the intervention. A Moderate recommendation means that the benefits exceed the potential harm (or that the potential harm clearly exceeds the benefits in the case of a negative recommendation), but the strength of the supporting evidence is not as strong.	Practitioners should generally follow a Moderate recommendation but remain alert to new information and be sensitive to patient preferences.
Limited	Evidence from two or more "Low" strength studies with consistent findings, or evidence from a single Moderate quality study recommending for or against the intervention or diagnostic. A Limited recommendation means the quality of the supporting evidence that exists is unconvincing, or that well-conducted studies show little clear advantage to one approach versus another.	Practitioners should be cautious in deciding whether to follow a recommendation classified as Limited, and should exercise judgment and be alert to emerging publications that report evidence. Patient preference should have a substantial influencing role.
Inconclusive	Evidence from a single low quality study or conflicting findings that do not allow a recommendation for or against the intervention. An Inconclusive recommendation means that there is a lack of compelling evidence resulting in an unclear balance between benefits and potential harm.	Practitioners should feel little constraint in deciding whether to follow a recommendation labeled as Inconclusive and should exercise judgment and be alert to future publications that clarify existing evidence for determining balance of benefits versus potential harm. Patient preference should have a substantial influencing role.
Consensus[1]	The supporting evidence is lacking and requires the work group to make a recommendation based on expert opinion by considering the known potential harm and benefits associated with the treatment. A Consensus recommendation means that expert opinion supports the guideline recommendation even	Practitioners should be flexible in deciding whether to follow a recommendation classified as Consensus, although they may set boundaries on alternatives. Patient preference should have a substantial influencing role.

Statement Rating	Description of Evidence Strength	Implication for Practice
	though there is no available empirical evidence that meets the inclusion criteria.	

[1]The AAOS will issue a consensus-based recommendation only when the service in question has virtually no associated harm and is of low cost (e.g., a history and physical) or when not establishing a recommendation could have catastrophic consequences.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Peer Review

A draft of the present guideline was peer reviewed. Peer review was performed using a structured peer review form (see Appendix VIII in the original guideline document). This form requires all peer reviewers to declare their conflicts of interest.

To determine who would serve as peer reviewers, the work group nominated external specialty societies before work on the guideline began. By having work groups specify organizations for review (as opposed to individuals), the AAOS is attempting to prevent overly favorable reviews that could arise should work group members choose reviewers whom they had personal or professional relationships. Peer reviewers are also blinded to the identities of the work group members when they peer review the draft.

The outside specialty societies were nominated at the beginning of the process and solicited for names of peer reviewers approximately six weeks before the final recommendation meeting for a guideline. The physician members of the American Academy of Orthopaedic Surgeons (AAOS) Guidelines Oversight Committee and the Evidence Based Practice Committee review all drafts of AAOS clinical practice guidelines. In addition, the American Dental Association (ADA) Council on Scientific Affairs will review the guideline.

On occasion, some specialty societies (both orthopaedic and non-orthopaedic) ask their evidence-based practice (EBP) committee to provide peer review of guidelines. The specialty society is responsible for compiling this type of review into one document before it is returned. The AAOS asks that the Chairpersons of these external EBP committees declare their conflicts of interest and manage the conflicts of interest of their committee members. Some specialty societies ask to post the guideline on their website for review by all of their interested members. Again, the AAOS asks that these reviews be collated into a single response by the specialty society, and that the person responsible for submitting this document to the AAOS disclose his or her financial conflicts of interest. It is also asked that this posting be to the "members" only portion of the specialty societies' website because the drafted document represents a "work in progress" and is subject to change as a direct result of the review process. In addition, the draft has not been formally approved by the AAOS Board of Directors or the ADA Board of Trustees. This is not an attempt to restrict input on the draft. Nor is it considered as a method to imply that outside specialty societies who provide review of the document necessarily agree with the stated recommendations. Hence, the reason all peer review comments and responses are made publicly available.

AAOS and ADA staff drafted initial responses to comments about methodology. These responses were then reviewed by the work group co-chairs, who also respond to questions concerning clinical practice and techniques. All changes to a recommendation as a result of peer review input were voted on and accepted by a majority of the work group members via teleconference. All changes to any guideline recommendation are based on the evidence in the guideline recommendations. Final changes to the guideline are incorporated, detailed in a summary sheet and forwarded with the document through the rest of the review and approval process.

The AAOS and ADA believe that it is important for guideline developers to demonstrate that they are responsive to peer review. Accordingly, after the AAOS Board of Directors approves a guideline, the AAOS posts all peer reviewer comments on its website (see http://www.aaos.org/research/guidelines/guide.asp to access these documents) with a point-by-point description of how the AAOS responded to each non-editorial comment made by each reviewer. Reviewers who wish to remain anonymous can notify the AAOS, and their names will be redacted; their comments, AAOS and ADA staff responses and their conflicts of interest will, however, still be posted for review.

Forty-seven outside organizations were solicited to provide peer reviewers for this document. The draft of this guideline was sent to seventeen review organizations who responded to the solicitation and a total of twenty-three peer reviewers received the document not including the AAOS Evidence-based Practice Committee and Guidelines Oversight Committee members. Eighteen of these reviewers returned comments (see Appendix IX in the original guideline document). The disposition of all non-editorial peer review comments was documented and accompanied this guideline through the public commentary and the AAOS guideline approval process.

Public Commentary

After modifying the draft in response to peer review, the guideline was sent for a thirty day period of "Public Commentary." Public Commentators are blinded to the identities of the work group members. Commentators consist of members of the AAOS Board of Directors (BOD), members of the Council on Research and Quality (CORQ), members of the Board of Councilors (BOC), and members of the Board of Specialty Societies (BOS). AAOS guidelines are automatically forwarded to the AAOS BOD and CORQ for commentary. Members of the BOC and BOS are solicited for interest. If they ask to see the document, it is forwarded to them. In addition, the guideline will be forwarded to the ADA Board of Trustees, Council on Dental Practice, Council on Access, Prevention and Interprofessional Relations, Council on Dental Benefit Programs, and Council on Dental Education and Licensure for commentary.

The draft guideline is, if warranted, modified in response to public commentary by the AAOS Clinical Practice Guidelines Unit, the ADA Division of Science, and the work group members. If changes are made as a result of public comment, these changes are summarized, and those who provided commentary are notified that their input resulted in a change in the guideline. Changes as a result of public commentary are based on evidence in the guideline recommendations. All changes are detailed in a summary sheet that accompanies the document through the approval process. Over one hundred commentators have had the opportunity to provide input into this guideline. Of these, fifty-eight members received the document and five returned comments (see Appendix IX of the original guideline document).

The AAOS Guideline Approval Process

This final guideline draft was approved by the AAOS Evidence Based Practice Committee, the AAOS Guidelines Oversight Committee, the AAOS Council on Research and Quality, the ADA Council on Scientific Affairs, the AAOS Board of Directors, and the ADA Board of Trustees. Descriptions of these bodies are provided in Appendix X in the original guideline document. These reviewing bodies do not have the option to modify the draft guideline during the approval process. They can only vote to approve it or reject it. Accordingly, no changes were made to this guideline during the approval process.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field). The recommendation rationales within the original guideline document discuss the results of the literature search supporting each recommendation.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Prevention of orthopaedic implant infection in patients undergoing dental procedures
- Avoidance of serious complications resulting from orthopaedic implant infection

Potential Harms

Most treatments are associated with some known risks. Therefore, discussion of available treatments applicable to the individual patient rely on mutual communication between the patient, dentist and physician, weighing the potential risks and benefits for that patient.

Contraindications

Contraindications

Contraindications vary widely based on the treatment administered. Therefore, discussion of available treatments applicable to the individual patient rely on mutual communication between the patient, dentist and physician, weighing the potential risks and benefits for that patient.

Qualifying Statements

Qualifying Statements

- This clinical guideline was developed by a physician and dentist volunteer work group and experts in systematic reviews. It is provided as an educational tool based on an assessment of the current scientific and clinical information and accepted approaches to treatment. The recommendations in this guideline are not intended to be a fixed protocol as some patients may require more or less treatment or different means of diagnosis. Patients seen in clinical practice may not be the same as those found in a clinical trial. Patient care and treatment should always be based on a clinician's independent medical judgment given the individual clinical circumstances.
- Some drugs or medical devices referenced or described in this Clinical Practice Guideline may not have been cleared by the Food and Drug Administration (FDA) or may have been cleared for a specific use only. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or device he or she wishes to use in clinical practice.
- This guideline should not be construed as including all proper methods of care or excluding methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific procedure or treatment must be made in light of all circumstances presented by the patient and the needs and resources particular to the locality or institution.
- This guideline is not intended for use as a benefits determination document. Making these determinations involves many factors not considered in the present document, including available resources, business and ethical considerations, and needs.

Implementation of the Guideline

Description of Implementation Strategy

Guideline Dissemination Plans

The primary purpose of the present document is to provide interested readers with full documentation about not only the work group recommendations, but also about how these recommendations were developed. This document is also posted on the American Academy of Orthopaedic Surgeons (AAOS) Web site .

Guidelines are first announced by a press release and then published on the AAOS and the American Dental Association (ADA) Web site. Guideline summaries are published in the *Journal of the American Academy of Orthopaedic Surgeons*, *Journal of Bone and Joint Surgery*, *Journal of the American Dental Association*, *AAOS Now and ADA News*. In addition, guidelines are disseminated at the AAOS Annual Meeting in various venues such as on Academy Row and at Committee Scientific Exhibits.

Selected guidelines are disseminated by webinar, an Online Module for the Orthopaedic Knowledge Online website, Radio Media Tours, Media Briefings, and by distributing them at relevant Continuing Medical Education (CME) courses and at the AAOS Resource Center.

Other dissemination efforts outside of the AAOS and ADA include submitting the guideline to the National Guideline Clearinghouse and distributing the guideline at other medical specialty societies' meetings.

Implementation Tools

Quick Reference Guides/Physician Guides

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

American Academy of Orthopaedic Surgeons, American Dental Association. American Academy of Orthopaedic Surgeons clinical practice guideline on prevention of orthopaedic implant infection in patients undergoing dental procedures. Rosemont (IL): American Academy of Orthopaedic Surgeons, American Dental Association; 2012. 320 p. [39 references]

Adaptation

Not applicable. The guideline was not adapted from another source.

Date Released

2012

Guideline Developer(s)

American Academy of Orthopaedic Surgeons - Medical Specialty Society

American Dental Association - Professional Association

Source(s) of Funding

No funding from outside commercial sources was used to support the development of this document.

Guideline Committee

Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures Clinical Practice Guideline Work Group

Composition of Group That Authored the Guideline

Work Group Members: William Watters, III, MD (*Co-Chair*); Michael P. Rethman, DDS, MS (*Co-Chair*); Richard Parker Evans, MD; Calin Moucha, MD; Richard J. O'Donnell, MD; Paul A. Anderson, MD; Elliot Abt, DDS; Harry C. Futrell, DMD; Stephen O. Glenn, DDS; John Hellstein, DDS, MS; David Kolessar, MD; John E. O'Toole, MD; Mark J. Steinberg, DDS, MD; Karen C. Carroll, MD, FCAP; Kevin Garvin, MD; Douglas R. Osmon, MD; Anthony Rinella, MD; Angela Hewlett, MD, MS

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Financial Disclosures/Conflicts of Interest

In accordance with American Academy of Orthopaedic Surgeons (AAOS) policy, all individuals whose names appear as authors or contributors to this clinical practice guideline filed a disclosure statement as part of the submission process. All panel members provided full disclosure of potential conflicts of interest prior to beginning work on the recommendations contained within this clinical practice guideline.

Conflicts of interest are disclosed with the American Academy of Orthopaedic Surgeons via a private on-line reporting database and also verbally at the recommendation approval meeting.

Disclosure Items: (n) = Respondent answered 'No' to all items indicating no conflicts. 1= Royalties from a company or supplier; 2= Speakers bureau/paid presentations for a company or supplier; 3A= Paid employee for a company or supplier; 3B= Paid consultant for a company or supplier; 3C= Unpaid consultant for a company or supplier; 4= Stock or stock options in a company or supplier; 5= Research support from a company or supplier as a PI; 6= Other financial or material support from a company or supplier; 7= Royalties, financial or material support from publishers; 8= Medical/Orthopaedic publications editorial/governing board; 9= Board member/committee appointments for a society.

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Richard Parker Evans, MD: 2 (Johnson & Johnson; Smith & Nephew)

Michael J. Goldberg, MD: 8 (Journal Children's Orthopaedics; Journal of Pediatric Orthopedics); 9 (AAOS); Submitted on: 04/27/2011.

Calin Stefan Moucha, MD: 2 (3M); 4 (Auxillium); 9 (AAOS); Submitted on: 10/02/2011.

Richard J. O'Donnell, MD: 9 (National Comprehensive Cancer Network; Northern California Chapter, Western Orthopaedic Association; Orthopaedic Surgical Osseointegration Society; Sarcoma Alliance); Submitted on: 10/04/2011.

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David J. Kolessar, MD: 4 (Zimmer); Submitted on: 04/07/2011.

Karen C. Carroll, MD, FCAP: 7 (ASM Press; McGraw-Hill); 8 (Infectious Diseases in Clinical Practice; Journal Clinical Microbiology/ASM Press); Submitted on: 10/05/2011.

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Douglas R. Osmon, MD: 9 (Musculoskeletal infection society); Submitted on: 10/05/2011.

Anthony Rinella, MD: (n); Submitted on: 10/05/2011.

Angela Hewlett, MD, MS: 9 (Society for Healthcare Epidemiology of America); Submitted on: 10/04/2011.

William Robert Martin, III, MD: 9 (National Board of Medical Examiners); Submitted on: 03/12/2010.

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Sharon Song, PhD: (n); Submitted on 1/28/2013.

Patrick Sluka, MPH: (n); Submitted on 10/19/2011.

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Nicholas Buck Hanson, MPH: (n); Submitted on 01/14/2013.

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Guideline Availability

Electronic copies: Available from the American Academy of Orthopaedic Surgeons Web site .

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726 (800 346-AAOS); Fax: (847) 823-8125; Web site: www.aaos.org .

Availability of Companion Documents

The following are available:

- Prevention of orthopaedic implant infection in patients undergoing dental procedures. Executive summary. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2012. 12 p. Electronic copies: Available in Portable Document Format (PDF) from the American Academy of Orthopaedic Surgeons (AAOS) Web site .
- Summary of recommendations. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2012. 3 p. Electronic copies: Available in PDF from the AAOS Web site .
- Shared decision making tool. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2012. 3 p. Electronic copies: Available in Portable Document Format (PDF) from the AAOS Web site .
- The new AAOS/ADA clinical practice guidelines on prevention of orthopaedic implant infection in patients undergoing dental procedures. Editorial. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2012. 4 p. Electronic copies: Available in PDF from the AAOS

Web site .

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726, 800-346-AAOS; Fax: (847) 823-8125; Web site: www.aaos.org .

Patient Resources

None available

NGC Status

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